

## ***DuraGlisten® 800 Corrosion Inhibitor***

– Extremely thin coat for durable anti-tarnish of copper and copper alloys

### **Characteristics:**

1. Extremely thin coat --- excellent, durable tarnish resistance.
2. Extremely thin coat --- imparts no paint marks/shade change on coppers.
3. Extremely thin coat --- electric conductivity of coppers barely impaired .
4. Improves the productivity of processing copper work pieces.
5. Contains no chrome or heavy metals, conforming to the RoHS regulations.
6. Easy to use and economical at low concentration

### **Description:**

#### *Facts and Problems*

To prevent from tarnishing, coppers and copper alloys are traditionally treated in two ways. One is to use chromates or other corrosion inhibitors by passivating the active surfaces of coppers. The other is to apply clear coatings on copper surfaces, so that a barrier film can be formed, to protect from oxidation.

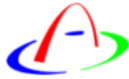
For recent decades, however, the use of chromates and other inorganic salts as corrosion inhibitors of coppers have been banned, or to be banned, from use, due to their toxicities and environmental concerns. On the other hand, the conventional organic corrosion inhibitors, such as benzotriazole (BTA), mercaptobenzothiazole (MBT), or other heterocyclic analogs, have served the protection of coppers, with only limited success. As a result, there remains a significant void in the market, where durable corrosion resistance of coppers is highly required.

The void cannot be completely filled by clear polymer type coatings, unfortunately, as a matter of fact that the processes of manufacturing copper work pieces, as well as their end uses, are so much varied. A protective film provided by clear coatings cannot fit all purposes, which can be exemplified as follows.

Example 1 - Copper is used in electronic and electrical appliances due to its excellent electric conductivity. Lacquers definitely cannot be used here.

Example 2 – In manufacturing copper and copper alloy work pieces, use of lacquers may result in sticking-together of pieces, paint marks, shade

We strive our best and believe in the accountability of information provided herein. However, whether expressed or implied, we warranty no particular applications of this product. It is at disposal of our customers' own tests, to meet their particular requirements or performance.



difference, and many other visual defects, which means rejects, lower productivity and high processing cost.

*What we can do*

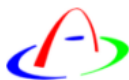
To overcome all these problems, **DuraGlisten® 800** is designed, developed, and characterized with the following remarkable properties.

1. **DuraGlisten® 800** contains special organo-inorganic complexes of low-molecular weights, which when diluted in 0.5~2.0% form by proper solvents, wet readily and adhere strongly to the surfaces of copper and copper alloys. After drying, a film of less than one micron thickness is formed tenaciously on the metal. This extremely thin film plays the key role of protecting copper from corrosion, due to its outstanding molecular structure. Furthermore, Unlike conventional polymer-type lacquers which form films of usually more than 10 microns thickness, the **DuraGlisten® 800** film is hardly detrimental to the electric conductivity of coppers, let alone paint marks and shade difference of the surfaces treated, or sticking-together of pieces during processing.
2. **DuraGlisten® 800** contains no chrome or any other heavy metals, which are toxic, carcinogenic, or environmentally unfriendly. As a result, its use conforms to even most stringent regulations, such as RoHS.

As a result, when **DuraGlisten® 800** is required, it must be diluted first with proper solvents, alcohols and polar solvents preferably, or mixtures of alcohol and water, to make up a 0.5 ~ 2.0% solution. By conventional methods, such as spraying, roller coating, or dipping, the diluted solution containing **DuraGlisten® 800** can be applied onto copper metal substrates, resulting in a extremely thin film. After setting at ambient temperature for 5~10 minutes, and then oven-drying at 120°C x 10 min. or above, a very thin protective film of 0.1~0.5 micron thickness can be obtained.

In our lab, the thin film of **DuraGlisten® 800**, as described above on red copper foils can pass 120 hours salt spray resistance, and we would suggest the similar performance on other copper alloys. However, since there are wide variations in the compositions and constitutions of copper alloys, it is strongly recommended to run tests in advance to suit individual purposes. Last, but not least, worth noting is, there is limited shelf life of the solutions prepared from **DuraGlisten® 800**, especially for water-containing system. The sensitivity of **DuraGlisten® 800** to moisture is the reason for the instability. However, the excellent performance of **DuraGlisten® 800** has been the driving force despite this nagging question. To meet the both end, as a result, it is advised that, the diluted solutions from **DuraGlisten® 800** ought to be

We strive our best and believe in the accountability of information provided herein. However, whether expressed or implied, we warranty no particular applications of this product. It is at disposal of our customers' own tests, to meet their particular requirements or performance.



prepared right for immediate application and used up to minimize any left-overs.

*How to do it*

1. To prepare diluted solutions from **DuraGlisten® 800** for ready-use **DuraGlisten® 800** is insoluble in water and therefore, requires proper organic solvents as the diluents in preparing its solutions for use. However, to prepare the solutions, some precautions are required for immediate attention as follows.

**Attention:** In preparing **DuraGlisten® 800** solutions, the working area has to be maintained in a well-ventilated condition, along with fire-fighting measures and personal protection facilities, to avoid any contacts with skins and eyes. In case of contact, the immediate, thorough rinse with water is required.

In general, only low concentration form of **DuraGlisten® 800** is required to achieve satisfactory performance. Should there be any other additional requirement, we would be glad to provide any pertinent advices.

Following are the two suggested formulations of conventional 1% **DuraGlisten® 800** solutions.

**A. Alcohol Soluble 1% **DuraGlisten® 800** Solution.**

Suggested Formula	by weight
<b>DuraGlisten® 800</b>	1.00
Isopropanol (IPA)	55.00
Isobutanol (IBA)	44.00
Total	100.00

**Process:** Add **DuraGlisten® 800** to IPA/IBA mixture and agitate vigorously and homogeneously for 20 minutes, to set for 1~2 hours before use.

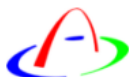
**Advantage:** Better shelf life, up to 10 days at ambient temperature

**Disadvantage:** Highly flammable

**B. Water Miscible 1% **DuraGlisten® 800** Solution.**

Suggested Formula	by weight
<b>DuraGlisten® 800</b>	1.00
Isopropanol (IPA)	49.00
Isobutanol (IBA)	10.00
Pure water	40.00
Total	100.00

We strive our best and believe in the accountability of information provided herein. However, whether expressed or implied, we warranty no particular applications of this product. It is at disposal of our customers' own tests, to meet their particular requirements or performance.



**Procedure:**

- A. Add **DuraGlisten® 800** to IPA/IBA mixture and agitate vigorously and homogeneously.
- B. Add water gradually under agitation, to check for homogeneity.
- C. Continue agitating for 20 minutes, to set for 1~2 hours before use.

**Advantage:** Less flammable

**Disadvantage:** Poor pot life, to see white precipitates in 12 hours at ambient temperature

2. To apply the diluted solutions of **DuraGlisten® 800**

In practical applications, we recommend the following procedures

- A. It is essential to have copper work pieces clean, dry and free from contaminations such as grease, oil, dirt, or stains. As a result, proper pre-treatment of metal items is deemed important.
- B. By conventional methods, such as spraying, roller coating, or dipping, the diluted **DuraGlisten® 800** solution can be applied onto copper substrates, resulting in a very thin film. After setting at ambient temperature for 5~10 minutes, and then oven-drying at 120 °C x 10 min. or above, a very thin protective film of 0.1~0.5 micron thickness can be obtained.
- C. Collect the work pieces after cool down to ambient temperature.
- D. Water miscible **DuraGlisten® 800** solution must be used up within 12 hours, whereas alcohol soluble one can be stable up to 10 days, as long as regular filtration and cleanness are well maintained.

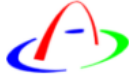
**Specifications:**

Appearance:	Dark amber solution
Chemical Type:	Organic/Inorganic Complex
Active Ingredient, 110 °C x 5 min.:	98 ± 1%

**Suggestions of Use:**

Note:

We strive our best and believe in the accountability of information provided herein. However, whether expressed or implied, we warranty no particular applications of this product. It is at disposal of our customers' own tests, to meet their particular requirements or performance.



The ready-for-use **DuraGlisten® 800** solutions contain volatile solvents. As a result, general precautionary safety measures, such as goggles, gloves and well-ventilated areas, are required, when handling the solutions. Avoid any contact of **DuraGlisten® 800** solutions with skin and eyes. Once contacted by accident, thorough rinse with water immediately is suggested.

1. Start : It is essential to have copper work pieces clean, dry and free from contaminations such as grease, oil, dirt, or stains. As a result, proper pre-treatment of metal items is deemed important.
2. In Use: To minimize contamination and maintain pot life, the solvent-based **DuraGlisten® 800** solutions have to be filtered regularly, preferably before and after use of each working day.
3. Cleaning: All the containers and equipments used for **DuraGlisten® 800** can be easily cleaned with or alcohols or polar solvents, preferably immediately after use.

#### Suggestions of Storage:

Unused, sealed **DuraGlisten® 800** in original container is guaranteed with pot life of six months as minimal, if it is stored in a cool, well-ventilated area and avoid any direct exposure to sunlight.

For those open, untempered **DuraGlisten® 800** in original containers, we suggest them sealed immediately after use, and use up within three months.

#### Packages:

**DuraGlisten® 800** is supplied in two forms of packages, namely, 20 kilograms in plastic pails and 200 kilograms in plastic drums.

We strive our best and believe in the accountability of information provided herein. However, whether expressed or implied, we warranty no particular applications of this product. It is at disposal of our customers' own tests, to meet their particular requirements or performance.